

What is claimed is:

1. A sheet feeder, comprising:

a sheet feed member which feeds recording sheets;

a separating member which forms a nip portion by pressing against the sheet feed member, rotates following the sheet feed member when only one recording sheet to be fed is inserted into the nip portion, and rotates reversely when a double-fed recording sheet is inserted while being stacked under the recording sheet to be fed;

a sheet detection unit which detects that each recording sheet fed out of the sheet feed tray has been inserted between the sheet feed member and the separating member;

a direction detection unit which detects a change of a rotation direction of the separating member; and

a separating force adjusting unit which gradually increases a reverse rotation torque of the separating member from a predetermined initial torque after the sheet detection unit detects the recording sheet, and stops the increase of the reverse rotation torque to maintain the reverse rotation torque when the direction detection unit detects reverse rotation of the separating member.

2. A sheet feeder according to claim 1, wherein, when the reverse rotation torque of the separating member has reached a predetermined upper limit reverse rotation torque, the separating force adjusting

unit maintains the upper limit reverse rotation torque.

3. A sheet feeder according to claim 1, wherein the separating force adjusting unit comprises:

a double-feeding state determination unit which detects that only one double-fed recording sheet has been inserted into the nip portion between the sheet feed member and the separating member while being overlapped with the recording sheet to be fed; and

a holding unit which stops the separating member without allowing rotation thereof based on a detection result of the double-feeding state determination unit.

4. A sheet feeder according to claim 3, wherein the double-feeding state determination unit determines that the only one double-fed recording sheet has been inserted between the sheet feed member and the separating member when the rotation direction of the separating member has been changed from the reverse rotation direction to a follower direction.

5. A sheet feeder according to claim 3, wherein the holding unit adjusts, based on a detection signal of the direction detection unit, a size of a drive current of a motor which rotationally drives the separating member.

6. A sheet feeder according to claim 2, further comprising an information collection unit which counts frequency where the separating member starts the reverse rotation before reaching the upper limit reverse rotation torque with respect to the accumulated number of fed recording sheets and stores the counted number.

7. An image forming apparatus comprising:

an image output unit which forms a recorded image on each of recording sheets according to image data; and

a sheet feeder which feeds the recording sheets to the image output unit, the sheet feeder including:

a sheet feed member which feeds the recording sheets;

a separating member which forms a nip portion by pressing against the sheet feed member, rotates following the sheet feed member when only one recording sheet to be fed is inserted into the nip portion, and rotates reversely when a double-fed recording sheet is inserted while being stacked under the recording sheet to be fed;

a sheet detection unit which detects that each recording sheet fed out of the sheet feed tray has been inserted between the sheet feed member and the separating member;

a direction detection unit which detects a change of a rotation direction of the separating member; and

a separating force adjusting unit which gradually

increases a reverse rotation torque of the separating member from a predetermined initial torque after the sheet detection unit detects the recording sheet, and stops the increase of the reverse rotation torque to maintain the reverse rotation torque when the direction detection unit detects reverse rotation of the separating member.

8. An image forming apparatus according to claim 7, wherein, when the reverse rotation torque of the separating member has reached a predetermined upper limit reverse rotation torque, the separating force adjusting unit maintains the upper limit reverse rotation torque.

9. An image forming apparatus according to claim 7, wherein the separating force adjusting unit comprises:

a double-feeding state determination unit which detects that only one double-fed recording sheet has been inserted into the nip portion between the sheet feed member and the separating member while being overlapped with the recording sheet to be fed; and

a holding unit which stops the separating member without allowing rotation thereof based on a detection result of the double-feeding state determination unit.

10. An image forming apparatus according to claim 9, wherein the double-feeding state determination unit determines that the

only one double-fed recording sheet has been inserted between the sheet feed member and the separating member when the rotation direction of the separating member has been changed from the reverse rotation direction to a follower direction.

11. An image forming apparatus according to claim 9, wherein the holding unit adjusts, based on a detection signal of the direction detection unit, a size of a drive current of a motor which rotationally drives the separating member.

12. An image forming apparatus according to claim 8, further comprising an information collection unit which counts frequency where the separating member starts the reverse rotation before reaching the upper limit reverse rotation torque with respect to the accumulated number of fed recording sheets and stores the counted number.

13. A method for preventing double feeding of recording sheets in a sheet feeder, the sheet feeder including:

a sheet feed member which feeds recording sheets; and
a separating member which forms a nip portion by pressing against the sheet feed member, rotates following the sheet feed member when only one recording sheet to be fed is inserted into the nip portion, and rotates reversely when a double-fed recording

sheet is inserted while being stacked under the recording sheet to be fed, the method comprising:

detecting that each recording sheet fed out of the sheet feed tray has been inserted between the sheet feed member and the separating member;

gradually increasing a reverse rotation torque of the separating member from a predetermined initial torque after performing the detection; and

stopping the increase of the reverse rotation torque to maintain the reverse rotation torque when reverse rotation of the separating member has been detected.

14. A method for preventing double feeding of recording sheets according to claim 13, further comprising, when the reverse rotation torque of the separating member has reached a predetermined upper limit reverse rotation torque, maintaining the upper limit reverse rotation torque.

15. A method for preventing double feeding of recording sheets according to claim 13, further comprising:

detecting that only one double-fed recording sheet has been inserted into the nip portion between the sheet feed member and the separating member while being overlapped with the recording sheet to be fed; and

stopping the separating member without allowing rotation thereof based on a result of the detection.

16. A method for preventing double feeding of recording sheets according to claim 15, further comprising determining that the only one double-fed recording sheet has been inserted between the sheet feed member and the separating member when the rotation direction of the separating member has been changed from the reverse rotation direction to a follower direction.